



ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF BROCK  
COMMUNITY OF MANILLA

SALT CONTAMINATION OF R. MONK

L. V. Pitts

1969

TD  
427  
.S24  
T69  
1969  
MOE

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TD  
427  
.S24  
T69  
1969

Township of Brock, community  
of Manilla : salt contamination  
of R. Monk / Pitts, L.V.

80902

ONTARIO WATER RESOURCES COMMISSION

REPORT ON FIELD INVESTIGATIONS

DATE OF EXAMINATION - August 6, 1969.

PLACE - Township of Brock  
Community of Manilla

MATTER INVESTIGATED - Salt Contamination of R. Monk  
Well Supply

AT REQUEST OF - Mr. R. E. Monk

INSPECTION MADE IN COMPANY WITH -

OTHER PARTIES SEEN -

REPORTS TO BE SENT TO -

A. K. Watt	R. E. Monk
J. R. Barr	Department of Highways
Central Records	Attention: A. Rutka (2)
Surveys and Projects Branch (2)	

OTHER RECOMMENDATIONS TO THE OFFICE RE PROCEDURE TO FOLLOW -

REPORT BY

*L. V. Pitts*  
L. V. Pitts.

NOTE: This completed form to be attached to each report.

## REPORT

# Ontario Water Resources Commission

Municipality Township of Brock -  
Community of Manilla. Date of Inspection August 6, 1969.  
Re: Salt Contamination of Dug Well Supply of R. E. Monk  
Field Inspection by L. V. Pitts Report by L. V. Pitts

### INTRODUCTION

A field investigation was conducted at Manilla on August 6, 1969, in response to a letter from Mr. Roy E. Monk, which stated that runoff waters originating at Highway 7 and the Victoria-Ontario County Line Road during the spring had contaminated his well supply with road salt.

The field work consisted of a brief examination of geologic and topographic features, a pumping test on the contaminated well, the collection of well-water samples for chemical and bacterial analyses, and interviews with local residents regarding their well supplies.

The logs of the wells near the Monk residence are listed in Table 1, and the locations of the wells are shown on Figure 1.

### OBSERVATIONS

#### Surface Drainage

Mr. Monk reported that, for the past five or six years, runoff water from Highway 7 has overflowed a catch basin at the junction of Highway 7 and the Ontario-Victoria

County Line Road during the spring, and moved northwest across the road toward the dug wells on his property.

As indicated in Figure 1, it was observed that the general slope of the land surface is to the northwest, and any overflow from the catch basin would move towards the Monk wells.

### Hydrogeologic Conditions

The Trenton limestone underlies Manilla and is intercepted by one well in the study area at a depth of 123 feet. The well-log data indicate that the overburden consists mainly of pebbly till, with occasional lenses of sand and gravel that yield small to moderate domestic supplies.

Wells 1, 2 and 3 are large-diameter dug wells, which are 20 feet, 12 feet, and 18 feet deep, respectively. These wells are either constructed of cement tiles or of cribbed stone and are not properly sealed to prevent surface water from entering the wells. Well 4 is drilled inside an old dug well and intercepts a water-bearing gravel formation at a depth of 85 to 87 feet.

The elevations of the static levels in the wells indicate that ground-water movement is toward the northwest in the direction expected, as the water table generally takes

a subdued form of the topography.

### WATER QUALITY

The results of the bacterial and chemical analyses are shown in tables 2 and 3.

Water samples collected from wells 1, 2 and 3 indicate the presence of coliform bacteria. It is likely that the bacteria are present in the water supply due to the poor sanitary construction of the wells.

Figure 2 shows the concentrations, expressed in parts per million, of the major ions in the collected samples.

Under natural conditions, the water from wells 1, 2, and 3 should have approximately the same chemical quality. As shown in Figure 2, the sample from well 1 has significantly higher concentrations of sodium-potassium and chloride ions, and slightly higher concentrations of calcium and magnesium ions than the sample from well 3. Water from well 2 has significantly higher concentrations of sodium-potassium and chloride ions than that from well 3. These results suggest that both wells 1 and 2 have been contaminated to varying degrees by sodium chloride. Well 1 is polluted to the degree that the water is no longer potable. The chemical analyses of samples periodically obtained during the three-hour pumping test on well 1 indicate a reduction in the chloride content

of about 200 ppm at the end of the test, but the concentration remained excessively high.

### CONCLUSIONS

The water supplies for the dug wells owned by Mr. Roy E. Monk have been contaminated by high concentrations of sodium chloride. The probable source of the contaminant is surface-water runoff originating at the junction of Highway 7 and the Ontario-Victoria County Line Road. The runoff has either entered the ground in the vicinity of the catch basin or the storm sewer and moved through the aquifer to the wells, or has flowed overland to the wells and down the annular spaces between the overburden and the wells. Available information is not sufficient to determine the method of pollutant travel. The reduction of the chloride concentration during the pumping of the Monk well suggests that the contaminant entered the well with overland runoff.

### RECOMMENDATIONS

It is recommended that:

1. The Department of Highways consider improvements to the drainage system in the vicinity of Highway 7 and the Ontario-Victoria County Line Road to prevent any movement



of surface water runoff on adjacent property or into the ground in the vicinity of the catch basin.

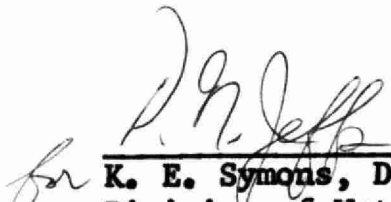
2. The wells of Mr. R. Monk be pumped for prolonged periods in an effort to reduce the salt concentrations. If this measure is successful, the wells should be chlorinated and properly sealed to prevent the entrance of any surface water. If the salt pollution problem persists, a well could be drilled to provide a potable supply of water. Suitable water-bearing formation in the overburden could likely be intercepted at a depth of about 90 feet.

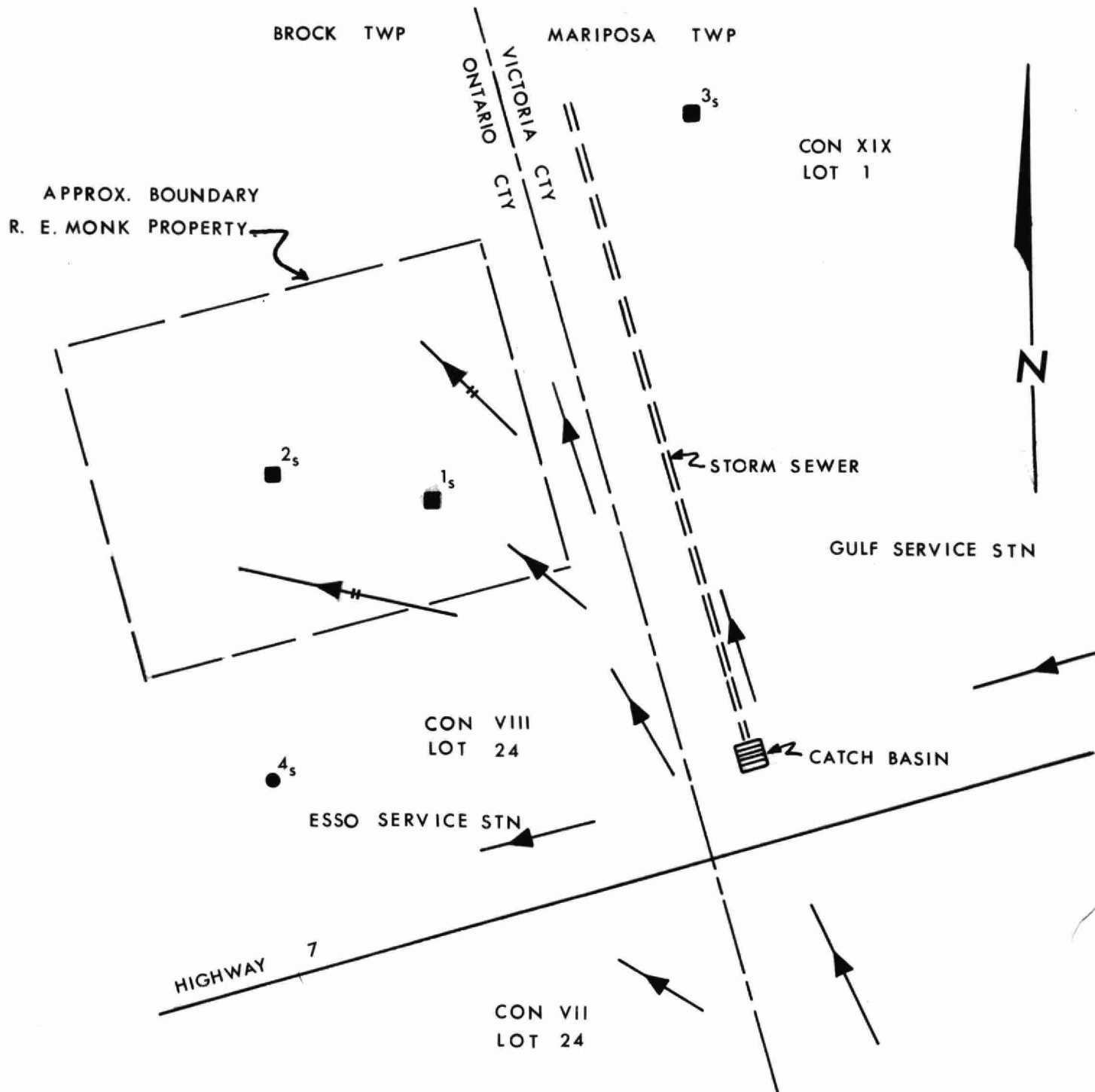
All of which is respectfully submitted,

Prepared by: L. V. Pitts,  
Assistant Geologist.

Supervised by: T. J. Yakutchik, Supervisor,  
Surveys and Projects Branch.

November 13, 1969.  
/lb

  
for K. E. Symons, Director,  
Division of Water Resources.



- DUG OVERBURDEN WELL
- DRILLED OVERBURDEN WELL
- s WATER SAMPLE LOCATIONS
- DIRECTION of SURFACE RUN-OFF
- H — SLOPE of WATER TABLE

ONTARIO WATER RESOURCES COMMISSION

BROCK TOWNSHIP  
MANILLA

INVESTIGATION of  
SALT CONTAMINATION

DATE: OCT / 69

SCALE:

DRAWING NO.

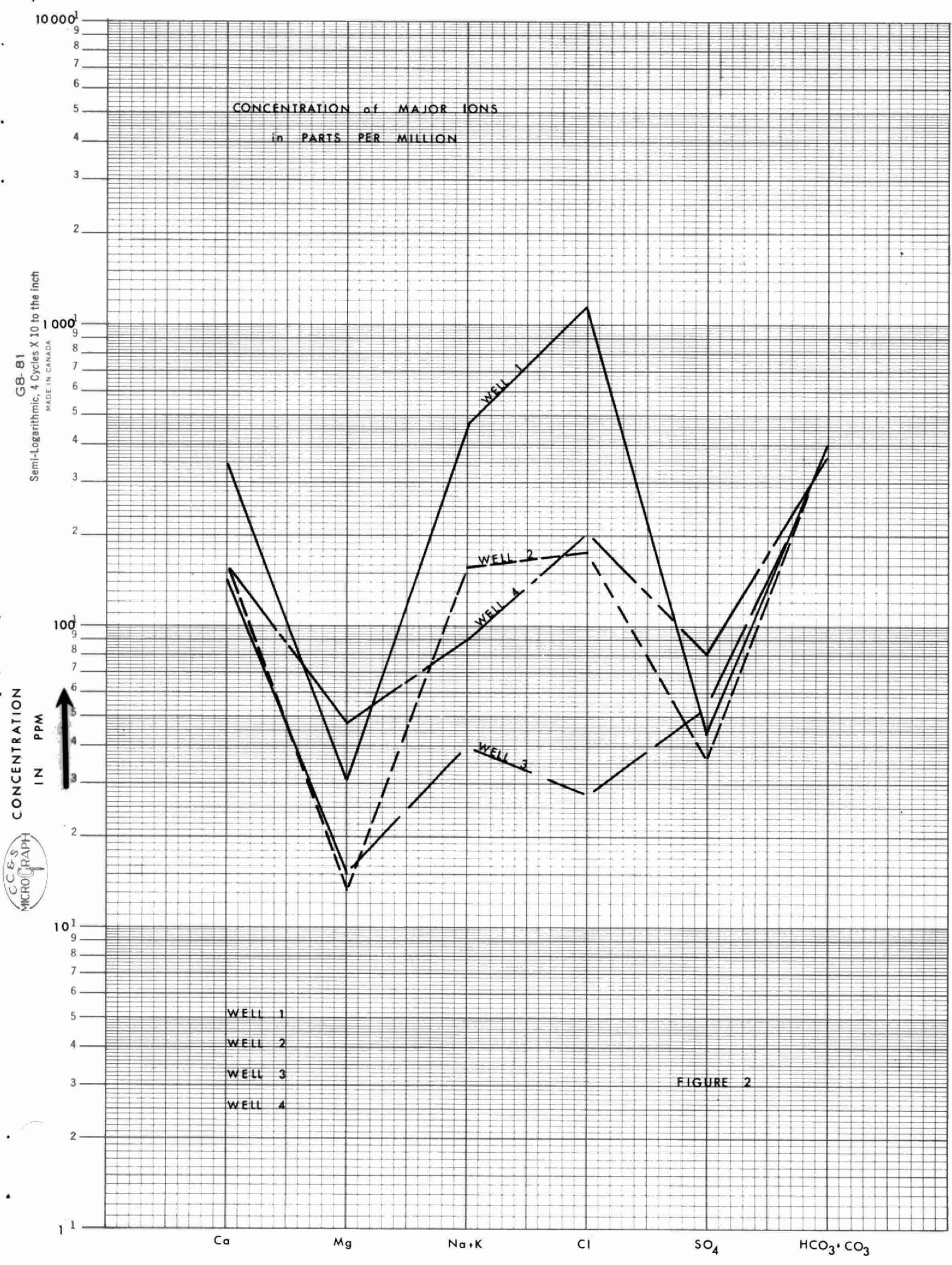
BY:

1" = 50'

FIG. 1

G8-81  
 Semi-Logarithmic, 4 Cycles X 10 to the inch  
 MADE IN CANADA  
 CONCENTRATION  
 IN PPM  
 C.C.E.S.  
 MICROGRAPH

CONCENTRATION of MAJOR IONS  
 in PARTS PER MILLION



WELL 1  
 WELL 2  
 WELL 3  
 WELL 4

FIGURE 2

MANILLA  
AREA OF SURVEY \_\_\_\_\_  
COUNTY Ontario- Victoria

ONTARIO WATER RESOURCES COMMISSION

DATE October , 1969  
RECORDER \_\_\_\_\_

## TABLE OF WATER WELL RECORDS

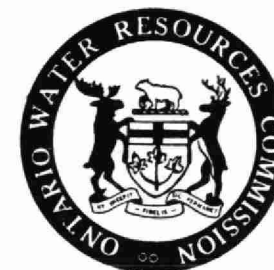
TABLE # 1

[illegible]

ONTARIO WATER RESOURCES COMMISSION — DIVISION OF LABORATORIES

BACTERIOLOGICAL REPORT

TABLE 2



FILE: Twp. of Brock, Wells

DATE: 

SAMPLED D M Y	ANALYSED D M Y	REPORTED D M Y
6 869	7 869	12 869

320198 320200

REPORT TO: L.V. Pitts, 40 St. Clair Ave. W., Toronto

COPY TO:

PARTICULARS:

LAB NO.

320198 1, Private well, R.E. Monk 320198

320199 2, Private well, George Colwell 320199

320200 3, Private well No. 2, R.E. Monk 320200

RESULTS PER 100 ML:

FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
		44	22
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
		G 300	186
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
		8100	272
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	
FECAL COLIFORMS	PLATE COUNT	BACKGROUND COLONIES	COLIFORM BACTERIA
STREPTOCOCCUS	PSEUDOMONAS	CLOSTRIDIUM	

+ CHLORINE PRESENT

G & L MEANS GREATER THAN & LESS THAN

SEE REVERSE SIDE FOR INTERPRETATION

## Interpretation of Bacteriological Results

### Coliform Bacteria

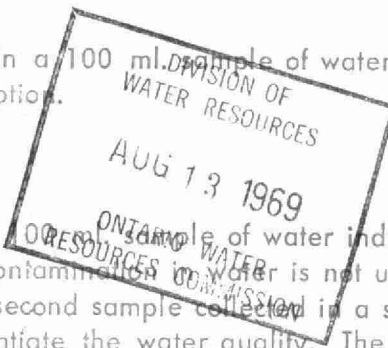
Coliforms are the main bacterial indicators of polluted water (drinking & bathing) although other groups will at times be used to further define the degree of impairment. Specific comments on other analyses will be made separately when required. When the results reported are for sewage samples, the following comments are not applicable.

### Absence of Coliforms

The absence of coliform bacteria in a 100 ml. sample of water indicates water of satisfactory quality for human and animal consumption.

### One to Ten Coliforms

One to ten coliform bacteria in a 100 ml. sample of water indicates that some sewage or soil bacteria are present. This level of contamination of water is not usually regarded as dangerous for drinking purposes. However, a second sample collected in a suitable sterile container should be submitted immediately to substantiate the water quality. The water source should be examined for possible access of contaminating materials.



### More Than Ten Coliforms

When more than ten coliform bacteria are present in 100 mls. of sample, the water can be suspected of containing sewage or soil bacteria that may be injurious to health. Such water should not be consumed. Following disinfection and elimination of the sources of contamination, a second sample should be submitted to re-assess the safety of the water. Please indicate the laboratory numbers of previous analyses when resubmitting samples.

### General

Variations inherent in sampling procedures and in the distribution of bacteria in water do not permit absolute judgment of the quality of a water source based on the analysis of a single sample. The Membrane Filter technique is generally used to analyse samples. This is not a chemical report.

### Sampling Frequency of Individual Supplies

Untreated water sources should be sampled four times a year (January, April, July and October).

### Bathing Waters

Water containing less than 2,400 coliform bacteria in 100 ml. is considered safe for bathing purposes.

ONTARIO WATER RESOURCES COMMISSION  
CHEMICAL LABORATORIES

Page 1 of 2

All analyses except pH reported in  
p.p.m. unless otherwise indicated

**WATER ANALYSIS**  
**TABLE 3**

1 p.p.m. = 1 mgm. / litre  
= 1 lb./100,000 Imp. Gals.

Municipality: Township of Brock		Report to: L. Pitts✓ Div. of Water Resources 40 St. Clair Ave. W.		C.C. A. Redekopp Central Files	
Source: Wells					
Date Sampled: Aug. 6/69		by: LVP		br	

Lab. No.	Hardness as CaCO <sub>3</sub>	Alkalinity as CaCO <sub>3</sub>	Iron as Fe	Chloride as Cl	pH at Lab.	Fluoride as F	Apparent Colour Units	Turbidity Units	Calcium as Ca	Sodium as Na	Potassium as K
W 5580	410	372	0.10	27	7.3				140	16	23
W 5581	458	411	0.55	174	7.3				162	59	96
W 5582	<del>508</del>	<del>364</del>	0.10	201	7.2				158	67	12
	Sulphate as SO <sub>4</sub>	Anionic Deterg- ents as ABS	Phenols in ppb	N I T R O G E N A S N				Phosphorus as P			
				Free Ammonia	Total Kjeldahl	Nitrite	Nitrate				
W 5580	53	0.1	0	0.07	0.34	0.037	1.4	-			
W 5581	35	0	0	0.01	0.41	0.23	2.6	.33			
W 5582	80	0	5	0.08	0.35	0.003	2.1	-			

W 5580	A-1, 2.	Private well	George Colwell	Well #3
W 5581	B-1, 2.	Well #2	R.E. Monk	
W 5582	C-1, 2.	Drilled - dug well -	Esso Service Station	Well #4

DIVISION OF  
WATER RESOURCES  
SEP 28 1969  
ONTARIO WATER  
RESOURCES COMMISSION



**WATER ANALYSIS**  
**TABLE 3 (Continued)**

1 p.p.m. = 1 mgm. / litre  
= 1 lb./100,000 Imp. Gals.

Municipality:		Report to:		c.c.							
Source:											
Date Sampled: Aug. 6/69 by: LVP											
Lab. No.	Hardness as CaCO <sub>3</sub>	Alkalinity as CaCO <sub>3</sub>	Iron as Fe	Chloride as Cl	pH at Lab.	Fluoride as F	Apparent Colour Units	Turbidity Units	Calcium as Ca	Sodium as Na	Potassium as K
W 5583	1115	405	0.20	1340	7.0				-	-	-
W 5584	1120	401	0.10	1356	6.9				-	-	-
W 5585	1120	402	0.10	1348	6.9				-	-	-
W 5586	964	418	0.20	1145	7.0				336	464	46
				Sulphate as SO <sub>4</sub>	Phenols in ppb	N I T R O G E N A S N				Anionic Detergents as ABS	
						Free Ammonia	Total Kjeldahl	Nitrite	Nitrate		
W 5586				44	3	0.52	0.24	0.014	3.9	0.1	
W 5583	1. Private well #1 R.E. Monk								5 minutes		
W 5584	2. " "								30 "		
W 5585	3. " "								1 hr.		
W 5586	4A, B. " "								3 hrs. - cloudy when taken		

DIVISION OF  
WATER RESOURCES

SEP 29 1969

ONTARIO WATER  
RESOURCES COMMISSION